of the College of Surgeons, and that of a young male to the University of Cambridge. The skull of a fœtal male, which was being towed overboard for the purpose of cleansing, was unfortunately lost; but next year it may be hoped that Captain Gray will have an opportunity of still further contributing to our knowledge of this interesting subject.

The presence of spermaceti in the head of the *Hyperoodon*, though subsequently denied by other observers, was noticed in 1779 by Chemniz, who in his account of a male taken near Spitzbergen says, after speaking of the oil, "Ausserdem aber auch aus seinem Kopfe und den übrigen Theilen einen Anker desjenigen reinsten Oels, so den Namen Wallrath oder *Sperma ceti* führet, gesammlet"[1].

Postscript.—Since the above note was communicated to the Society, I have received a letter from my friend Mr. Robert Collett, of the Christiania Museum, giving some account of a specimen of *Hyperoodon latifrons* (as, according to the common belief, he names it) which was washed ashore at the Loffoden islands in April 1881[2]. He describes the head as perfectly quadrangular, just like a "Kuffert" (portmanteau) with rounded angles, and altogether more like that of a *Physeter* than an ordinary *Hyperoodon*, the anterior part of the forehead being perpendicular, and the rostrum scarcely projecting beyond it. The body was proportionally slender as compared with the large head. It will be seen that this description exactly corresponds with Captain Gray's sketches (figs. 1–5, p. 728). With regard to these drawings it is important to observe that, as they were not drawn to scale, the bodies appear shorter and stouter than they would if composed from exact measurements, the reason being that, in any long object when seen from a single point of view, the effects of perspective diminish the length much more than the breadth.

2. Notes on the Characters and Habits of the Bottlenose Whale (*Hyperoodon rostratus*). By David Gray, Commander of the Whaling Steamer 'Eclipse.' (Communicated by Prof. Flower, F.R.S., P.Z.S.)

[Received November 28, 1882.]

These Whales are occasionally met with immediately after leaving the Shetland Isles in March, and north across the ocean until the ice is reached, near the margin of which they are found in greatest numbers; but they are seldom seen amongst it.

Although it is not their nature to keep in amongst the ice, they like to frequent the open bays, for the shelter it gives them from the sea. Sometimes a point of ice overlaps them; it is only then that they are seen going out again towards the ocean. They are also to be met with from the entrance of Hudson's Straits and up Davis Straits, as far as 70° north lat., and down the east side round Cape

[1] *Loc. cit.* p. 185.

[2] See "Meddelelser om Norges Pattedyrs i Aarene 1876–81," by R. Collett.

Farewell, all round Iceland, north along the Greenland ice to 77° north lat.; also along the west coast of Spitzbergen and east to Cherry Island, in lat. 72° north and long. 19° east. Beyond these limits I have never seen them; but doubtless they are to be found as far as the Straits of Belle Isle on the west, and east to Nova Zembla.

From the fact that they are not seen in summer further south than a day's sail from the ice, it would appear that they migrate south in the autumn, and north again in the spring.

They are gregarious in their habits, going in herds of from four to ten. It is rare to see more than the latter number together, although many different herds are frequently in sight at the same time. The adult males very often go by themselves; but young bulls, cows and calves, with an old male as a leader, are sometimes seen together.

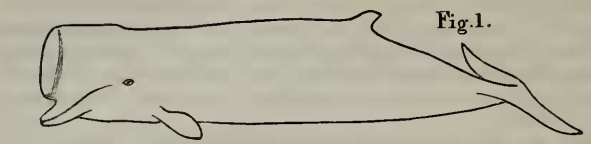
They are very unsuspicious, coming close alongside the ship, round about and underneath the boats, until their curiosity is satisfied. The herd never leaves a wounded companion so long as it is alive; but they desert it immediately when dead; and if another can be harpooned before the previous struck one is killed, we often capture the whole herd, frequently taking ten, and on one occasion fifteen, before the hold of them was lost. They come from every point of the compass towards the struck one in the most mysterious manner.

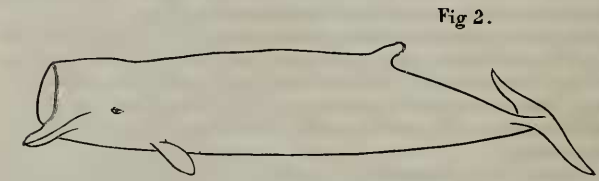
They have great endurance, and are very difficult to kill, seldom taking out less than from three to four hundred fathoms of line; and strong full-grown males will run out seven hundred fathoms, remaining under water for the long period of two hours, coming to the surface again as fresh as if they had never been away; and if they are relieved of the weight by the lines being hauled in off them before they receive a second harpoon and a well-placed lance or two, it often takes hours to kill them. They never die without a hard struggle, lashing the sea white about them, leaping out of the water, striking the boats with their tails, running against them with their heads and sometimes staving the planks in, frequently towing two heavy whale-boats about after them with great rapidity.

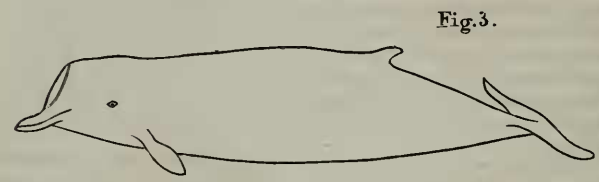
They vary in colour from black in the young to light brown in the older animals. The very old turn almost yellow, the beak and front of the head being quite white, with a white band round their necks; all of them are greyish-white in the belly.

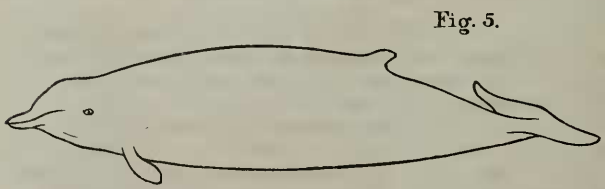
Their tails, instead of being notched in the centre as in most other Whales, are round in the middle; and they have great vertical strength in their rump. They can leap many feet out of the water, even having time while in the air to turn round their heads and look about them, taking the water head first, and not falling helplessly into it sideways like the larger Whales.

The full-grown Whale is thirty feet long by twenty feet in circumference, and yields two tons of oil besides two hundredweight of spermaceti. It is remarkable that they should yield a









Figs. 1–4. Outlines of a series of male Bottlenosed Whales, to show the progressive development of the head from the youngest (fig. 4) to the oldest (fig. 1).

Fig. 5. Outline of adult female.

These figures are from sketches by Captain Gray, but are not drawn to scale. With regard to their proportions see observations on p. 726.

Fig. 6.

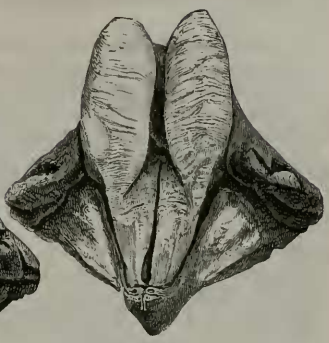


Fig. 7.

Fig. 9.

Fig. 8.

Front views, from photographs, of the skulls of the four male specimens of which the external characters are given on the opposite page.

Fig. 6. Skull of old male, represented in fig. 1.
Fig. 7. Skull of slightly younger male (fig. 2).
Fig. 8. Skull of still younger male (fig. 3).
Fig. 9. Skull of young male (fig. 4), which both in external form and cranial characters closely resembles the female.

hundredweight of spermaceti to each ton of oil, being exactly the same proportion that the Greenland Whale yields of whalebone to the ton of oil.

In the female, in front of the bones of the head there is a cavity containing a small quantity of oil which is quite colourless and twice the density of that rendered from the blubber. In the males, instead of oil there is a solid lump of fat similar in shape to, and about twice the size of, a large water-melon.

The following is an analysis of their oil, as compared with sperm-oil, prepared by Mr. Alfred H. Allen of Sheffield, Public Analyst for the West Riding of Yorkshire.

	Bottlenose-oil.	Sperm-oil.
Specific gravity at 155° C.	·8763	·8778
Flashing point, ° C.	264	260
Viscosity (seconds)	141	137
Unsaponifiable matter (spermyl alcohol)	39·76	40·50
Sp. gravity of the unsaponifiable matter	·8363	·8307
Rise of temp. with sulphuric acid, ° C.	41	45
Colour-reaction with sulphuric acid	Pale brown, changing on stirring to light violet, and again to brown.	Dark brown, becoming somewhat darker with tinge of violet on stirring.

These results show that the closest similarity exists between genuine sperm-oil and the oil from the Bottlenose Whale.

Their ordinary food consists of a bluish-white cuttle-fish, six inches long by three inches in circumference, and pointed towards the tail. The stomachs of the Whales that were examined contained nothing but their remains; and we never took one alongside without seeing some of them floating out of their mouths.

They evidently have a great depth to go to find them, judging from the length of time that they remain away, and from the long heavy blasts they make on coming to the surface again.

They are much infested with lice about the fins and in patches over their bodies. I send with this a piece of skin cut from the front of the head of a young female, which will serve to show the manner in which they adhere to the skin[1].

During the present season, in May and June, two hundred and three were killed; of these ninety-six were full grown males, fifty-six cows, and fifty-one younger males.

From a cow a young male was cut out, measuring ten feet long by five feet six inches in circumference. The length of the mother was twenty-nine feet.

The heads of two males were measured round the eyes: one was

[1] [These agree exactly with *Cyamus thompsoni*, Gosse, Ann. & Mag. Nat. Hist. 2nd ser. vol. xvi. p. 30, pl. iii. fig. 11 (1855), which was found upon the skin of a Hyperoodon captured in Portland Roads on the 2nd of October 1854, as recorded by Mr. W. Thompson (Ann. and Mag. Nat. Hist. vol. xiv. 2nd ser. p. 347, 1854). This is separated generically from the other *Cyami* by Lütken under the name of *Platycyamus* (Christiania Videns. Sellsk. Forhandl. xiii. p. 279, 1871).—W. H. F.]

thirteen feet one inch, the other twelve feet six inches, which may be taken as the average size of the circumference of the head of the full-grown male.

In the past three seasons I have seen thousands of them; and from constant careful observation while they were in life, and very often close about the ship—also when dead, examining many of their skulls after being taken on board and flenched, the only conclusion that can be come to is, that there is but one species of the Bottlenose Whale inhabiting the Northern seas. There are no flat-headed females. It is only the older males that have the flat perpendicular heads notched back towards the beak, with high crest and close frontal bones.

The accompanying sketches of male Whales (figs 1–5, p. 728), and photographs of their skulls (figs. 6–9, p. 729), will help to show how their heads flatten, and also the progressive manner in which the bones of the head enlarge and close up as they become older.

3. On the Classification of the *Comatulæ*. By P. Herbert Carpenter, M.A., Assistant Master at Eton College.

[Received November 23, 1882.]

In the last part of the Proceedings of this Society Prof. F. J. Bell [1] has proposed "a method of formulating the results attained to, as regards our knowledge of the specific characters of the members" of the family *Comatulidæ*.

That such a method is absolutely necessary for systematic work in a family which comprises so few genera but so many species, was made clear to me before I had been studying the group for many months; and I was therefore in no way surprised to hear that Prof. Bell had arrived at the same conclusion soon after his commencing the examination of the large collection of *Comatulæ* in the British Museum, together with the very remarkable series sent home by Dr. Coppinger, of H.M.S. 'Alert.' I am sorry, however, that Prof. Bell has so soon published his system of formulation; for I cannot but think that a little more experience of the remarkable variations in the group-characters would have caused him to modify it considerably.

I had intended to reserve any publication of the method of formulation which has gradually developed itself during my work on the 'Challenger,' 'Blake,' and other collections, until the appearance of the 'Challenger' Report. But the numerous errors contained in Prof. Bell's paper require an immediate correction, which would be out of place in the 'Challenger' volumes.

Prof. Bell's method is an ingenious one, especially where he

[1] "An Attempt to apply a Method of Formulation to the Species of the *Comatulidæ*; with the Description of a new Species," P. Z. S. 1882, part iii. pp. 530–536, Pl. XXXV.